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Frequently Asked Questions:
Perfluorochemicals (PFCs) Detected in the Pease Tradeport Water System

Background Information

The Pease Tradeport, formerly the Pease Air Force Base, is an Environmental Protection Agency (EPA) Superfund site. A Superfund site is an abandoned area with hazardous waste that requires cleanup to avoid potentially negative effects on people and/or the ecosystem. In April 2014, the three wells supplying drinking water to the Pease Tradeport were tested by the Air Force for perfluorochemicals (PFCs) for the first time at the request of the EPA and Department of Environmental Services (DES), because these chemicals are considered emerging contaminants of concern.

On May 12, 2014, the U.S. Air Force notified the New Hampshire Department of Environmental Services (DES) that water samples collected from the Haven well on April 16, 2014 showed levels of perfluorooctane sulfonic acid (PFOS) that were above the provisional health advisory (PHA) level set by the EPA. Perfluorooctanoic acid (PFOA) was also elevated but at a level just below the PHA. Additional testing showed PFOS and PFOA were detectable at the Smith and Harrison wells, the two other water supply wells located at the Tradeport, but at levels well below the PHA. The water from all three wells was sampled at the well; levels were not tested from the tap but are presumed to be lower at the tap because water from the three wells was mixed together, diluting the PFOS and PFOA. Additional PFCs, for which there are no PHA levels established, were also tested for and detected at the three wells, including perfluorohexane sulfonic acid (PFHxS).

DES immediately notified the City of Portsmouth, which shut down the Haven well. The other two wells are still in use. DES, the EPA, and the Air Force are conducting ongoing testing to ensure the water in these wells and surrounding private wells remains safe.

I. Recently Added FAQs (2/3/2016)

Why are multiple laboratories being used to test for PFCs?

The 471 blood samples that participants submitted for PFC testing during the first round of PFC testing, which ran from April – June 2015, were analyzed by the Centers for Disease Control and Prevention (CDC) laboratory.

During the second round of PFC testing, which ran from August – October 2015, more than 1,100 individuals submitted blood samples for PFC testing. The requests for testing exceeded the capacity of any one laboratory to test in a timely manner. The NH DHHS, therefore, established contracts with the AXYS Analytical Services and

California state biomonitoring laboratories. Individual result report forms will specify which laboratory performed the testing on a participant's blood sample.

Are there differences in the PFCs tested for at the different laboratories?

All three laboratories tested participants' blood samples for the three main PFCs which have been found at higher levels, including PFOS (perfluorooctane sulfonic acid), PFOA (perfluorooctanoic acid), and PFHxS (perfluorohexane sulfonic acid). Both the CDC and California state biomonitoring laboratories also tested participants' blood samples for six other PFCs that are often found in people's blood. AXYS Analytical Services laboratory, however, tested participants' blood samples for only four additional PFCs (which the CDC and California laboratories also tested for). There are two PFCs that have been found at very low levels in participant's blood that AXYS did not test for, but which were tested at the CDC and California laboratories; these PFCs are Me-PFOSA-AcOH, and Et-PFOSA-AcOH. It is unclear what detection of any of these chemicals means for a person's health, and the levels found in blood do not predict what, if any, health impact might occur.

The PFCs tested by various laboratories are listed in the table below:

PFCs Tested	Abbreviations	Laboratories Performing Testing
perfluorohexane sulfonic acid	PFHxS	CDC, California, AXYS
perfluorooctane sulfonic acid	PFOS	CDC, California, AXYS
perfluorooctanoic acid	PFOA	CDC, California, AXYS
perfluorononanoic acid	PFNA	CDC, California, AXYS
perfluorodecanoic acid	PFDeA	CDC, California, AXYS
perfluoroundecanoic acid	PFUA	CDC, California, AXYS
perfluorooctane sulfonamide	PFOSA	CDC, California, AXYS
2-(N-methyl-perfluorooctane sulfonamido) acetic acid	Me-PFOSA-AcOH	CDC, California
2-(N-ethyl-perfluorooctane sulfonamido) acetic acid	Et-PFOSA-AcOH	CDC, California

CDC = Centers for Disease Control and Prevention laboratory

California = California state biomonitoring laboratory

AXYS = AXYS Analytical Services laboratory

Why does my report show that I have a PFC level(s) less than a certain amount?

A "<" (less than) sign on the results report form indicates that the PFC was less than the level that the laboratory can accurately measure. The PFC(s) could have either not been detected, or detected at a very low level below what the laboratory can measure.

Are there differences in the testing methods between the different laboratories? Is my result comparable to someone else's who was tested at a different laboratory?

All three laboratories use similar methodology (liquid chromatography and mass spectrometry) to test for levels of PFCs in a person's blood. There may be differences, however, with exactly how PFCs are separated from a person's blood prior to measurement. With any laboratory testing, there will be variation between laboratories and even between testing runs within a single laboratory. All three laboratories, however, maintain

strict quality control measures to ensure reliability of test results. Regardless of which laboratory is used, your test results will tell you about your recent exposure to various PFCs.

Participants should be aware that there may be differences in how the results are reported from the different laboratories. The number of PFCs reported may be different (as discussed above), and the lower level that the laboratory can accurately measure and report may be different. As an example, a participant may have on their result report form a PFC level from AXYS that is listed as “<0.5 µg/L,” whereas the comparison study on the same report form might list a value as “<0.1 µg/L” as the lower level of detection. This is due to differences in the process that determine what the various testing laboratories are able to accurately measure and report. Regardless, the individual report of your test results will be accurate and will compare your levels with other study populations.

Can I compare my test results with others from the Pease Tradeport PFC Testing Program?

We have not yet performed a full analysis on all the test results. When we have received all the test results back, we will perform a complete analysis, issue a full report of the testing program, and host a community meeting. There are, however, summary results from the first round of testing, during which a total of 471 individuals were tested for PFCs. A summary of these results was presented during a prior presentation, which can be found on our website, but we have reproduced the results here. Below are the summary tables for 363 adults and adolescents aged 12 years and older, and 108 children aged 11 years and younger, who were tested during the first round of testing. You can compare your test results with the summary tables below.

Table: Summary of 363 Adult and Adolescent Results (aged 12 years and older) From the First Round of Testing.

PFC Tested	PEASE TRADEPORT (Level in µg/L)			NHANES, 2011-2012* (Level in µg/L)		
	Geometric Mean	Min	Max	Geometric Mean	Min	Max
PFOA	3.0	0.2	15.9	2.1	<0.1	43.0
PFOS	7.5	<0.1	75.2	6.3	0.1	235.0
PFHxS	4.6	0.2	68.7	1.3	<0.1	47.8
PFUA	0.1	<0.1	0.9	NC	<0.1	7.0
PFOSA	<0.1	<0.1	0.1	NC	<0.1	0.6
PFNA	0.7	<0.1	4.9	0.9	<0.1	80.8
PFDeA	0.2	<0.1	5.6	0.2	<0.1	17.8
Me-PFOSA-AcOH	0.1	<0.1	1.1	NC	<0.1	4.3
Et-PFOSA-AcOH	<0.1	<0.1	0.4	NC	<0.1	0.7

NC=Not Calculated. The national average was not calculated for this PFC because the proportion of results below limit of detection was too great to provide a valid result.

* Comparison numbers are from: the *Fourth National Report on Human Exposure to Environmental Chemicals*, Updated Tables (February, 2015): <http://www.cdc.gov/exposurereport/>.

Table: Summary of 108 Child Results (aged 11 years and younger) From the First Round of Testing.

PFC Tested	PEASE TRADEPORT (Level in µg/L)				TEXAS STUDY* (Level in µg/L)		
	Geometric Mean	Median	Min	Max	Median	Min	Max
PFOA	4.0	4.5	<0.1	12.0	2.9	<0.1	13.5
PFOS	8.9	8.9	0.5	30.8	4.1	<0.2	93.3
PFHxS	6.1	7.4	0.2	26.2	1.2	<0.1	31.2
PFUA	<0.1	<0.1	<0.1	0.5	N/A	N/A	N/A
PFOSA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.6
PFNA	1.1	1.0	<0.1	5.2	1.2	<0.1	55.8
PFDeA	0.2	0.2	<0.1	0.7	<0.2	<0.2	2.1
Me-PFOSA-AcOH	0.1	<0.1	<0.1	1.3	<0.2	<0.2	28.9
Et-PFOSA-AcOH	<0.1	<0.1	<0.1	0.2	<0.2	<0.2	0.7

*Comparison numbers are from: Schecter et al. Polyfluoroalkyl Compounds in Texas Children from Birth through 12 Years of Age. *Enviro Health Perspect* 2012;120(4):590-594.

The Pease Tradeport Testing Program has found levels of PFOA, PFOS, and PFHxS above the national average. What does this mean for the health of individuals in our community?

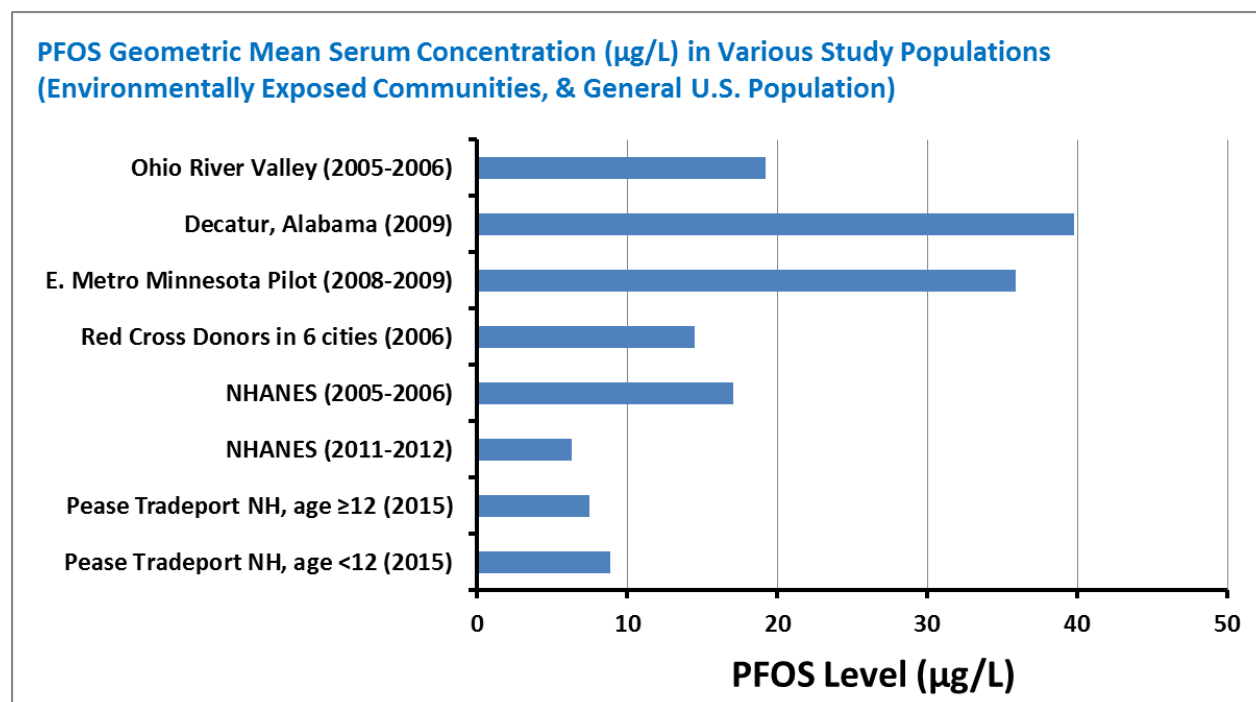
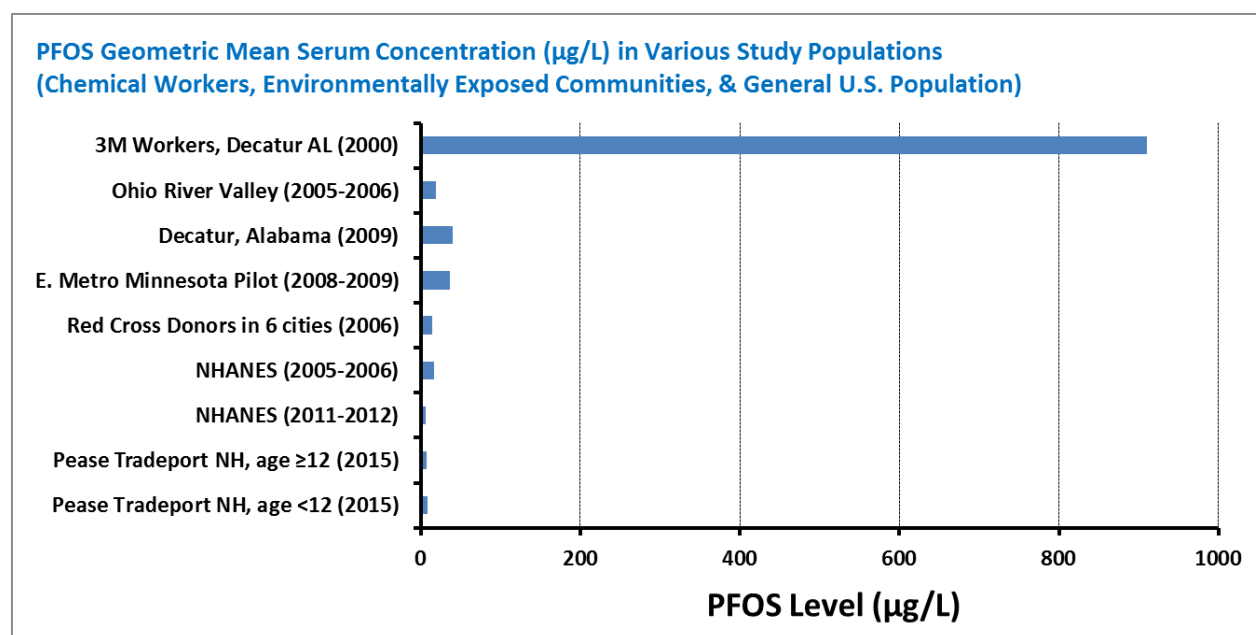
Based on the first 471 blood test results from the first round of testing, the average levels of PFOS and PFOA found in the Pease Tradeport community are only slightly above those seen in the general U.S. adolescent and adult population (aged 12 years and older), based on 2011-2012 data. Levels of detected PFOA are similar to levels in the U.S. population about 10 years ago; while levels of detected PFOS are lower than levels in the U.S. population 10 years ago. Levels of detected PFHxS are above the U.S. population levels, but still lower than levels seen in other environmentally exposed communities. Overall, PFC levels in the Tradeport community are lower than those seen in studies of other environmentally exposed communities and chemical plant workers. This is illustrated in the graphs below which compare the Pease Tradeport adolescent & adult participants (aged 12 years and older), and the pediatric participants (aged less than 12 years), with levels found in studies of other chemical plant workers, environmentally exposed communities, and the general U.S. population.

The levels of PFCs do not predict what, if any, health impact might occur as a result of PFC exposure. The testing program also cannot tell an individual or community where exposure to PFCs occurred. It is likely that some of the PFCs detected in individuals' blood came from contaminated drinking water, but there are many other sources of PFC exposure in a person's living and work environments.

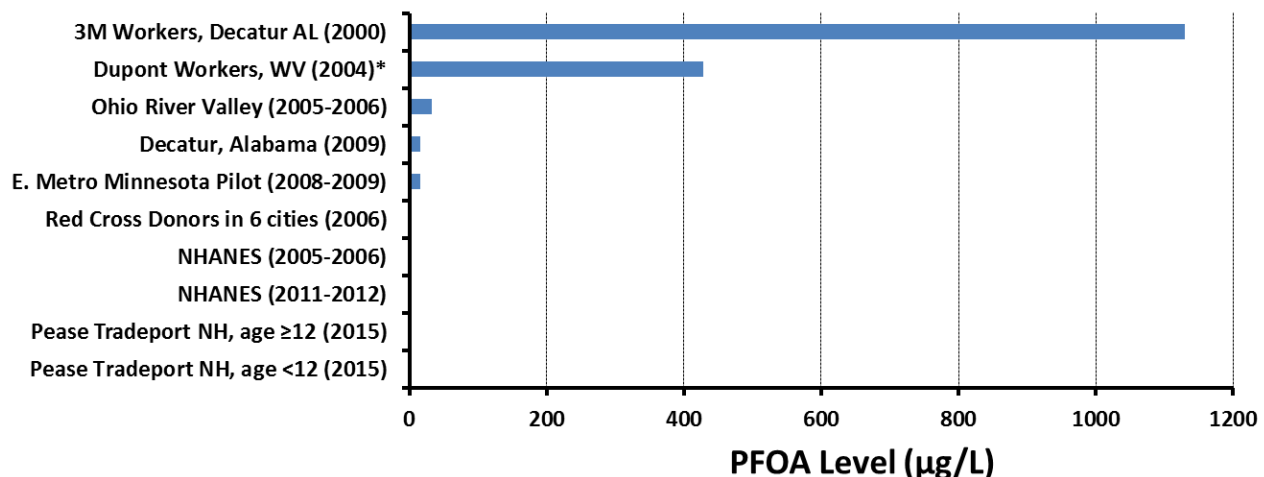
Graphs: Comparison of the first 363 adolescent and adult participant results (age 12 years of age and older), and the first 108 pediatric participant results (age < 12 years of age) in the first round of testing:

Note about concentration: $\mu\text{g/L}$ = Micrograms per Liter = Parts per Billion

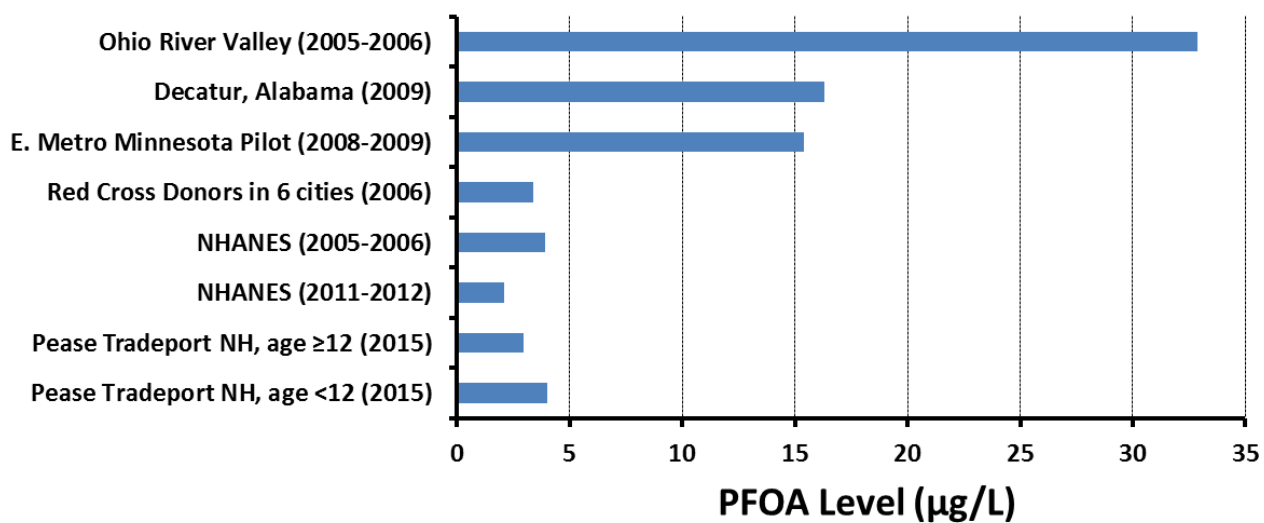
* Indicates Arithmetic mean reported (instead of geometric mean). Arithmetic mean is usually higher than the geometric mean.



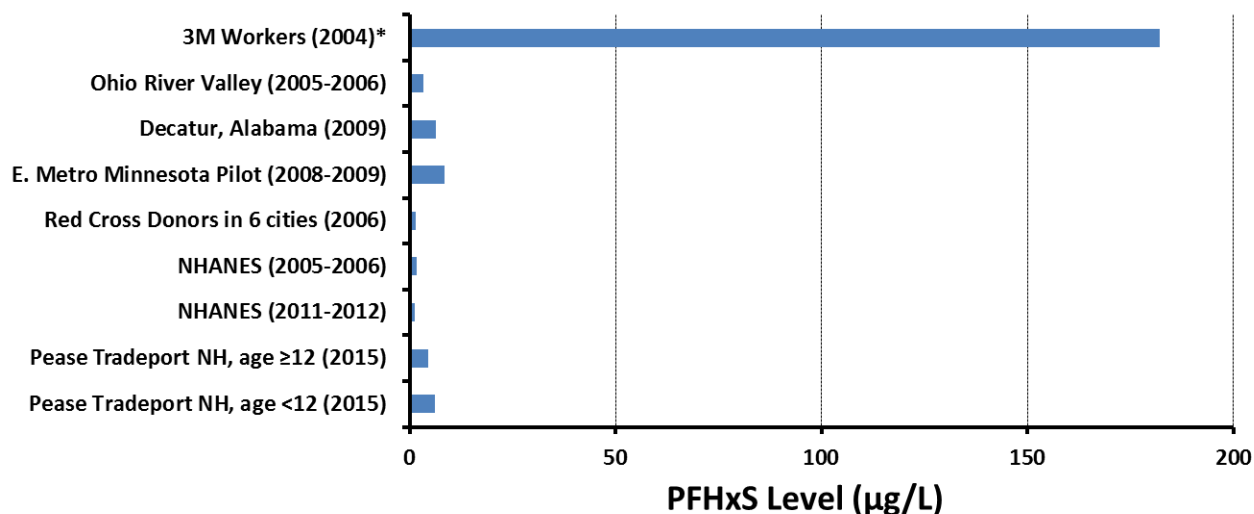
**PFOA Geometric Mean (unless otherwise noted*) Serum Concentration ($\mu\text{g/L}$) in Various Study Populations
(Chemical Workers, Environmentally Exposed Communities, & General U.S. Population)**



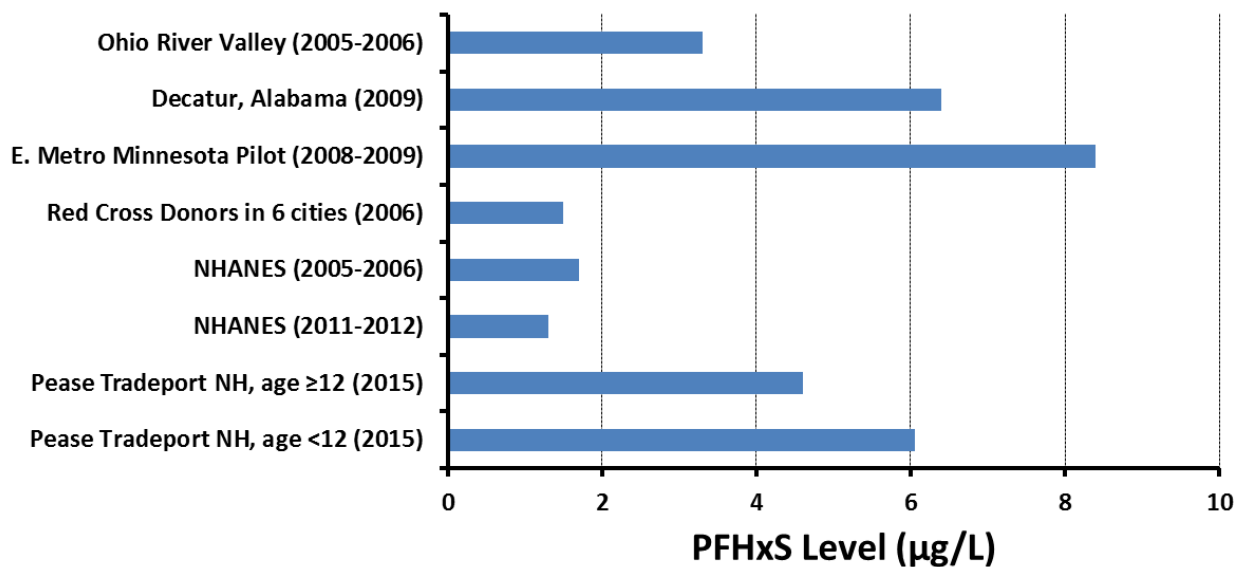
**PFOA Geometric Mean Serum Concentration ($\mu\text{g/L}$) in Various Study Populations
(Environmentally Exposed Communities, & General U.S. Population)**



**PFHxS Geometric Mean (unless otherwise noted*) Serum Concentration ($\mu\text{g/L}$) in Various Study Populations
(Chemical Workers, Environmentally Exposed Communities, & General U.S. Population)**



**PFHxS Geometric Mean Serum Concentration ($\mu\text{g/L}$) in Various Study Populations
(Environmentally Exposed Communities, & General U.S. Population)**



References for Study Population Graph Comparisons:	
3M workers(PFOS and PFOA)	Olsen GW, et al. Epidemiologic assessment of worker serum perfluorooctanesulfonate (PFOS) and perfluorooctanoate (PFOA) concentrations and medical surveillance examinations. J
3M workers (PFHxS)	Olsen GW, et al. Half-life of serum elimination of perfluorooctanesulfonate,perfluorohexanesulfonate, and perfluorooctanoate in retired
Dupont workers	Sakr CJ, et al. Cross-sectional study of lipids and liver enzymes related to a serum biomarker of exposure (ammonium perfluorooctanoate or APFO) as part of a general health survey in a cohort of occupationally exposed workers. J Occup Environ Med. Oct 2007;49(10):1086-1096.
Ohio River Valley	Frisbee et al. The C8 Health Project: Design, methods, and participants. Env Health Persp 2009;117(12):1873-82.
Decatur, Alabama	ATSDR. Exposure Investigation Report: PFC serum sampling in the vicinity of Decatur, AL Morgan, Lawrence, and Limestone Counties. Apr 2013. Accessed at: http://www.atsdr.cdc.gov/HAC/pha/Decatur/Perfluorochemical_Serum%20Sampling.pdf
East Metro Minnesota pilot	Minnesota Dept of Health. East Metro PFC biomonitoring pilot project. Jul 2009. Accessed at: http://www.health.state.mn.us/divs/hpcd/tracking/biomonitoring/projects/pfcfinalrpt2009.p
Red Cross donors	Olsen GW, et al. Decline in PFOS and other PFCs in American Red Cross adult blood donors, 2000-2006. Environ Sci Technol. 2008;42:4989-4995.
NHANES	CDC. Fourth National report on human exposure to environmental chemicals. Feb 2015. Accessed at: http://www.cdc.gov/exposurereport/

What is the status of the Haven Well?

Since May, 2014 when the three public water supply wells at Pease Tradeport were found to be contaminated with perfluorochemicals (PFCs), the U.S. Air Force, City of Portsmouth and other stakeholders have worked to restore the groundwater aquifer and to re-establish a safe supply of drinking water for the community. A Final Design Work Plan has been submitted for the construction of a water treatment system for the Haven Well, the most heavily contaminated well on the Tradeport. In addition, the City of Portsmouth and the Air Force have

recently signed an agreement that would allow for the design of a water treatment system for the two remaining water supply wells, the Smith and Harrison Wells.

As part of the Air Force's ongoing environmental investigations into the contamination at the Tradeport, the Smith and Harrison Wells are routinely sampled for the presence of PFCs. Low levels of these compounds have been reported, but these levels remain well below the EPA provisional health advisory levels for drinking water. The Air Force has also sampled some nearby residential wells in the town of Newington, and with one exception, water from these private Newington homes have been found to be below the provisional health advisory levels established by the EPA.

The City of Portsmouth has collected all of the Tradeport drinking water data and has made it available to the public at: <http://www.cityofportsmouth.com/publicworks/phwn.html>.

II. General Information on PFCs

What are PFCs?

Perfluorochemicals (PFCs), also called perfluoroalkyls, are a group of man-made chemicals that have been used for decades to manufacture household and commercial products that resist heat, oil, stains, grease, and water. Many PFCs, including PFOA, PFOS, and PFHxS are commonly found in our environment and do not break down easily. PFOA and PFOS are the only two PFCs for which the EPA has developed provisional health advisory levels in drinking water.

What are PFCs used for?

PFCs are used in a variety of industrial applications and consumer products, including manufacturing nonstick cookware and for surface protection in stain-resistant carpets, clothing, furniture, and some paper and cardboard products used for food packaging (e.g., microwave popcorn bags, fast food wrappers, and pizza boxes). PFCs are also used in numerous products to help them flow freely. These include paints, cleaning products, and certain firefighting foams called aqueous film-forming foams (AFFFs) that are used to fight fuel-based fires. Use of these foams at the fire-training area on the Pease Tradeport is thought to be the cause of the Haven well contamination. A list of commercial and industrial uses is outlined in the table below.

Certain PFCs are being phased out of use in commercial and home applications. In 2002, the 3M Company, the primary manufacturer of PFOS, completed a voluntary phase-out of production of PFOS and related PFCs. In 2006, eight major manufacturers of PFCs committed to working towards the elimination of PFOA from emissions and products by 2015. The EPA estimates that these companies are on track to eliminate PFOA by the end of 2015. Other PFCs continue to be used.

Commercial Products	Industrial Uses
Cookware (Teflon®, Nonstick) Fast Food Containers Candy Wrappers Microwave Popcorn Bags Personal Care Products (Shampoo, Dental Floss) Cosmetics (Nail Polish, Eye Makeup) Paints and Varnishes Stain Resistant Carpet Stain Resistant Chemicals (Scotchgard®) Water Resistant Apparel (Gore-Tex®) Cleaning Products Electronics Ski Wax	Photo Imaging Metal Plating Semiconductor Coatings Aviation Hydraulic Fluids Medical Devices Firefighting Aqueous Film-Forming Foam Insect Baits Printer and Copy Machine Parts Chemically Driven Oil Production Textiles, Upholstery, Apparel and Carpets Paper and Packaging Rubber and Plastics

What do we know about PFCs in the environment?

PFCs have been found in soil, air, and water and do not break down easily in the environment. PFCs in air emissions are thought to remain in the air for days to weeks, and can travel long distances before falling to the ground. Some PFCs are also able to move through soil and easily enter groundwater where they can travel long

distances. Because PFCs remain in the environment for a long time, environmental exposure will still be possible even after production of these chemicals stops.

How are people exposed to PFCs?

People are most likely to have been exposed to PFCs by ingesting them. This includes:

- Drinking contaminated water
- Eating food that may contain high levels of PFCs (e.g., fish and shellfish)
- Eating food contaminated by packaging materials containing PFCs (e.g., popcorn bags, fast food containers, pizza boxes)
- Hand-to-mouth transfer from surfaces treated with PFC-containing stain protectants, such as carpets, which is thought to be most significant for infants and toddlers

People can also be exposed by breathing air that contains dust contaminated with PFCs (from carpets, upholstery, clothing, etc.), or from fabric sprays that contain PFCs. Skin contact with the PCFs does not cause significant absorption.

Workers in industries that manufactured or used PFCs may have been exposed to these chemicals in much greater amounts than the general public.

Infants may be exposed to PFCs through breast milk, but PFCs do not appear to be highly concentrated in breast milk. An unborn child can be exposed to PFCs from the mother's blood because PFCs also can cross the placenta, although different PFCs cross the placenta in different amounts.

Why are PFCs considered “contaminants of emerging concern” by the EPA?

Over the past two decades, techniques to test for PFC concentrations in water have improved. Globally, low concentrations of PFCs have been detected in many bodies of water which previously were not known to contain PFCs. The EPA generally refers to chemicals that are newly detected in the environment, or detected at higher concentrations than expected, as “contaminants of emerging concern.” The label itself does not imply that PFCs necessarily cause negative health effects. Rather, it implies the need for further investigation of the health and environmental effects of PFCs.

Are there regulations, standards or guidelines about PFCs in drinking water?

Neither the federal government nor the State of New Hampshire regulates PFCs in drinking water and there are no state or federal enforceable standards. Under the Federal Safe Drinking Water Act, the EPA identifies contaminants in public drinking water that need further study to determine if a standard should be established. PFCs are among the contaminants being monitored, and the EPA has developed provisional drinking water standards for PFOS and PFOA.

A provisional health advisory (PHA) reflects drinking water levels that are currently considered safe for both adults and children. The provisional levels for PFOS and PFOA are based on adverse effects seen in animal studies. The provisional health advisory levels are 0.4 parts per billion (ppb) for PFOA and 0.2 ppb for PFOS. The EPA recommends that action be taken to reduce levels if they are above the PHA. In response to the PFOS level found at the Haven well, the well was voluntarily removed from use.

What do we know about PFCs in people?

Studies show that nearly all people have PFCs in their blood, regardless of age. Some PFCs, including PFOA, PFOS, and PFHxS stay in the human body for many years. The time it takes for blood levels to go down by half is about four years for PFOA, five years for PFOS, and eight years for PFHxS, assuming there is no additional exposure to the chemical.

The CDC's National Health and Nutrition Examination Survey tests for PFCs in the general U.S. population and as certain PFCs have been phased out of production over the last 15 years, the average level of PFOA and PFOS in people's blood has been decreasing. Based on the most recent data (2011–2012), the average blood levels are as follows:

- PFOA: 2.1 parts per billion, with 95% of the general population at or below 5.7 parts per billion
- PFOS: 6.3 parts per billion, with 95% of the general population at or below 21.7 parts per billion
- PFHxS: 1.3 parts per billion, with 95% of the general population at or below 5.4 parts per billion

Studies of workers at chemical plants have shown individual blood PFC levels in the hundreds or thousands of parts per billion.

What health effects have been associated with exposure to PFCs?

Some animal studies have shown adverse effects in animals, but this does not necessarily predict effects in people. Human studies have evaluated whether PFCs can cause a variety of health effects, including:

- Changes to the liver (increased liver enzymes)
- Increased cholesterol
- Changes in sex hormone levels, and delayed puberty and reproductive development
- Changes in thyroid hormone levels and reported thyroid disease
- Effects on immune function (lower antibody response to immunization)
- Effects on growth and development (lower birth weight in infants, obesity in adolescents/adults)
- Decreased kidney function
- Higher incidence of diabetes
- Occurrence of cancers (discussed further below)

These studies have been limited in their ability to determine whether PFCs cause the studied health effects. These limitations include:

- Study designs that are not meant to determine whether an identified health concern is actually caused by PFCs
- Lack of accounting for other factors (e.g., other chemicals) that could cause the health outcome
- Reporting only weak relationships between PFC exposure and the studied health effect, where the health effect:
 - is not medically important (too small of a health change to matter)
 - is not statistically significant (the effect might not be related to PFCs)

While there are some studies that inconclusively suggest a relationship between PFC exposure and a health effect, there are also many studies looking at the same health outcome that do not show a relationship with PFC exposure. Given the inconsistent and sometimes contradictory findings in the medical literature, no one can be sure about the health effects of PFCs on humans. Further study is needed to say whether PFCs cause health changes in humans.

Do PFCs cause cancer?

Because of inconsistencies and contradictory findings between studies, there have not been any definitive conclusions by the EPA about a link between PFC exposure and cancer in people. Additional studies are needed to determine the risk of cancer.

Animal studies have suggested an increase in certain types of glandular cancers, called adenomas, related to PFOA and PFOS exposure. These include liver, testicular, pancreatic, and thyroid adenomas. However, the way that animals' bodies process these PFCs is not necessarily the same way that humans' bodies do. In addition, most of the animal studies evaluated significantly higher levels of exposure than those typically seen in humans. For these reasons, data on health effects in animals cannot be assumed to predict health effects in people.

So far, studies of PFCs in humans have not shown conclusive evidence that PFC exposure leads to various cancers. Some studies have suggested a possible connection between PFC exposure and cancers of the prostate, kidney, testicles, bladder, breast, and thyroid. These include studies of workers exposed to high levels of PFCs and studies of people exposed to lower levels through environmental contamination. These studies have the same limitations mentioned above in the "health effects" section, which limit their ability to determine whether PFCs cause cancer.

Connections found between PFC exposure and cancers tend to be weak and not consistent, meaning that some studies suggest a connection and others do not. Further study is needed to more definitively say whether PFCs cause cancer in humans.

Are children more susceptible to potential health effects from PFCs?

Hand-to-mouth exposure from environmental sources (carpets, dust, etc.) is a more significant source of PFC exposure for infants and toddlers, who crawl on the ground and often put their hands or objects into their mouths. Because they are smaller, children also can be exposed to higher doses of PFCs for their body weight than an adult.

A variety of health outcomes in children have been studied related to PFOA and PFOS exposure, including fetal growth and development, cognitive and behavioral development, immune function, thyroid function, and reproductive development and function. While some studies have suggested a relationship between PFC exposure and these health outcomes, there are also many studies that do not show a relationship with PFC exposure. Given the inconsistent findings, no one can be sure about the health effects of PFCs on humans, and further study is needed.

Do PFCs pose a health risk to pregnant women?

There has not been any convincing evidence that PFOA or PFOS exposure has an effect on miscarriage or birth defect rates. One of the most studied health outcomes has been the effect of PFOA and PFOS exposure on weight and size of fetuses (unborn babies). Some studies have found that PFOA and PFOS exposure may lead to decreased fetal weight and size, but others have not shown this relationship. Follow-up studies have also suggested that these children with low birth weight grow at normal rates.

III. Pease Tradeport Water Contamination & PFC Testing Program

What prompted the Portsmouth Water Authority to take action at the Haven well?

In April 2014 the three wells supplying drinking water to the Tradeport were tested for PFCs for the first time. The level of PFOS was 2.5 parts per billion (ppb), above the PHA level of 0.2 ppb, while the level of PFOA was 0.35 ppb, just below the PHA level of 0.4 ppb.

The levels of these chemicals in the other two wells supplying water to the Tradeport were far below the EPA's provisional levels. The levels were measured at the wellhead, and because the tap water at the Tradeport drew from all three wells, the levels in the drinking water are presumed to be lower than levels measured at the Haven wellhead.

The Haven well was closed immediately by the City of Portsmouth once the PFC levels were known. The other two wells remain in use and are needed to adequately supply water to the Pease Tradeport.

How did the Haven well become contaminated with PFCs?

The Tradeport operated as an Air Force base from 1956 to 1991. The Air Force began using a type of firefighting foam called aqueous film-forming foam (AFFF) around 1970 for plane crashes and firefighting training. It is suspected that PFCs from this foam contaminated area groundwater.

Who has potentially been exposed to PFCs from the Haven well?

People who have consumed water from the Tradeport water system may have been exposed to PFCs; however, it is unknown for how long, or at what levels, PFCs have been in the drinking water. The Tradeport wells primarily serve businesses located at the Tradeport, as well as the Air Force and New Hampshire Air National Guard facilities. Water from these wells can provide emergency backup to the Portsmouth water supply, but has been used infrequently for this purpose. As a precaution, the City of Portsmouth's seven water sources were tested for PFCs in May 2014 and no PFCs were detected in the city water supply.

Why did DHHS test people?

DHHS offered testing to anybody who may have consumed the contaminated water at the Tradeport and wanted to know the level of PFCs in their blood. It is unclear what detection of any of these chemicals means for a person's health, and the levels found in blood do not predict what, if any, health impact might occur. The results can only be compared to results found through other U.S. testing programs.

Will results be publically released?

A summary report of the results of the DHHS testing program will be released once all sample results are received from the laboratory. No person's name or other identifiable information will be included in the report. This is to respect everyone's privacy, and is in accordance with the national Health Information Privacy and Accountability Act.

How long does it take these chemicals to be eliminated from the body? Is there anything I can do to speed up this process?

It takes about four years for the PFOA, five years for the PFOS, and eight years for the PFHxS in your body to decrease by half if there is no additional exposure to the chemicals. There is no treatment to remove PFCs from a person's body. There is no action an individual can take to speed up the elimination of PFCs from the body.

If I have elevated blood levels of PFCs should I be retested in the future? If so, when?

PFC levels in the blood will decrease slowly over time. Because there is no way to remove PFCs faster, we do not recommend additional testing.

There has not been a decision made on whether or not to conduct repeat testing of those individuals with comparatively high blood PFC levels in the future. Future testing would need to be several years after the initial test because of the long time that PFOA, PFOS, and PFHxS remain in the body. There is currently no medical reason to retest.

Is there going to be research to determine if the Haven well PFCs caused harm?

DHHS will review all the results once testing is complete and discuss the results with the community advisory board and the Centers for Disease Control and Prevention, Agency for Toxic Substances and Disease Registry (CDC/ATSDR). The results of testing will help inform what further action could be taken to address community health concerns. Currently, the ATSDR is considering the feasibility of performing a health study in combination with other exposed populations around the country. DHHS will also make an effort to update the public and health professionals on significant new research regarding the health effects of PFCs that becomes available in the future.

Who can I call to talk to if I have questions about the PFC testing program?

The New Hampshire Department of Health and Human Services has established a public inquiry line. Please call (603) 271-9461 Monday–Friday 8 am–4 p.m. if you have additional questions about the testing program.

IV. PFC Test Results

Who can I call to talk to if I have health concerns?

DHHS has established a relationship with the Northern New England Poison Center (NNEPC) to set up an inquiry line to answer any questions individuals have about PFCs once they have received their test results. The NNEPC can be reached at 1-800-562-8236. Individuals with specific concerns about their health should discuss them with their primary care provider. DHHS has provided educational materials about PFCs to primary care providers so they can address possible health concerns.

If an individual continues to have concerns about their health, their primary care provider may be able to refer the individual to a Boston-area environmental health medical group that specializes in environmental health concerns. These clinicians, however, will not be able to tell an individual what their level means for their health.

Who is responsible for monitoring my health if I have high levels of PFCs?

Your primary care provider can address concerns you have about your health. The Air Force with input from the EPA and DES will continue to monitor all public water supplies at the Tradeport to ensure they remain safe to drink.

Are there any medical tests I need to have performed by my primary care provider now that I know I have PFCs in my body?

There are no specific tests that are medically necessary. Any decisions on further testing or follow-up evaluation should be made with your healthcare provider. DHHS has provided education and recommendations to healthcare providers in New Hampshire so they can have an informed discussion with patients about the significance of finding PFCs in a person's blood.

DHHS is recommending that all healthcare providers follow their patients and perform any routine diagnostic or screening tests as medically indicated, based on their history, physical examination, and assessment, and not based on PFC levels.

What should I do if my child's blood has PFCs in it?

If you are concerned about your child's health, you should talk to your child's primary care provider. Because PFCs are everywhere in our natural and home environments, it is expected that children will have detectable levels. There are no definite health effects that have been identified in children related to PFC exposure. There is also no way to medically remove PFCs from a person's body. If levels are elevated, parents may consider reducing PFC exposure as discussed below.

Are PFCs passed to a baby through breast milk?

PFCs can be passed from mother to child through breast milk, but PFCs are not thought to build up in breast milk. The decision to breastfeed or bottle feed should not be based on a concern for PFC exposure. The benefits of breastfeeding are expected to outweigh any possible health effects from PFCs that may be in breast milk.

How do I reduce my family's exposure to PFCs in the future?

Families can reduce their exposure to PFCs by limiting their use of consumer products that may contain PFCs. This includes:

- Greasy or oily food that comes packaged in material that may use PFC-containing grease repellant linings, such as microwave popcorn bags, fast food containers, and pizza boxes.
- Use of stain resistant sprays that may contain PFCs on furniture, carpets, and clothing.
- Use of other products with the words "fluoro" or "perfluoro" in their ingredients list.

Additionally, because PFCs can easily contaminate ground water, residents with drinking water supplied by private wells can have their water tested for PFCs if there is suspicion for PFC contamination. Residents with private wells contaminated by PFOS and PFOA above the EPA's Provisional Health Advisory levels should find an alternate source of drinking water or install point-of-use treatment devices to filter their tap water.

To reduce PFC exposure through drinking water, we recommend the following:

- **Test private wells:** To see a list of labs that have been approved for testing under the Unregulated Contaminant Monitoring Rule (UCMR) using EPA Method 537, visit <http://water.epa.gov/lawsregs/rulesregs/sdwa/ucmr/ucmr3/upload/lablist.pdf>.
- **Reduce PFCs in your water:** Filters containing activated carbon or reverse osmosis membranes have been shown to be effective at reducing PFCs in water supplies:
 - A list of treatment devices tested for PFC removal by the Minnesota Department of Health has been provided: <http://www.health.state.mn.us/divs/eh/wells/waterquality/poudevicefinalsummary.pdf>
 - New Hampshire Department of Environmental Services (DES) also has general information about water treatment devices: <http://des.nh.gov/organization/commissioner/pip/factsheets/dwgb/documents/dwgb-2-5.pdf>
 - It is recommended that consumers check with the manufacturer of any device before purchase to determine the effectiveness of the device at filtering PFCs.
 - The DES Drinking Water and Groundwater Bureau are available to discuss the public's concerns about water treatment options and can be reached at (603) 271-2513 or dwgbinfo@des.nh.gov.

Why are higher levels of PFHxS being found in people's blood compared to the general U.S. population?

Perfluorohexane sulfonic acid (PFHxS) is one of the nine PFC chemicals that the CDC laboratory tests for that are commonly found in people's blood. Like PFOS and PFOA, PFHxS can remain in a person's body for many years. It takes about eight years for a person's blood level of PFHxS to go down by half if there is no additional exposure to the chemical.

It is possible that an individual was exposed to PFHxS from drinking contaminated well water on the Pease Tradeport. PFHxS was detected in the Haven well at a level of 0.83 parts per billion (ppb), with much smaller amounts also found in the Smith well (0.013 ppb) and the Harrison well (0.036 ppb). There is not currently an EPA provisional health advisory for safe levels of PFHxS in drinking water.

PFHxS is also a common contaminant in household dust, and has been used in making fire-fighting foams and in stain-resistant sprays (i.e. Scotchgard®). As with PFOS and PFOA, the level of PFHxS in an individual's blood cannot predict what, if any, health impact might occur.

What are PFDeA, PFNA, and PFUA, and why are these PFCs found in people's blood?

Perfluorodecanoic acid (PFDeA), Perfluoroundecanoic acid (PFUA), and Perfluorononanoic acid (PFNA), are three other PFCs that the CDC routinely tests for as part of its laboratory panel. These PFCs are commonly found in people's blood, and were also tested for in the Pease Tradeport wells. PFNA was found in the Haven well at very low levels (0.017 ppb), and was not detected in the Harrison or Smith wells. PFDeA was found at very low levels in the Haven well (0.005 ppb) and the Smith well (0.004 ppb), and was not detected in the Harrison well. PFUA was only detected at very low levels in the Smith well (0.017 ppb), and was not detected in the Haven or Harrison wells. It is unlikely that there was significant exposure to these PFCs from contaminated drinking water at the Pease Tradeport.

My results report shows that I have PFC levels above the national average and above the 95th percentile compared to the general U.S. population. What does that mean?

Individuals 12 years of age or older will have their blood test results compared to national levels found in the general U.S. population from samples collected in 2011-2012 as part of the National Health and Nutrition Examination Survey. These comparison numbers will include a mean and 95th percentile.

A mean (or average) is a way of describing and summarizing a set of numbers. Most people will not have a blood level of a PFC that exactly matches the average number; it will either be above or below. The fact that an individual has a PFC level above the average should not cause concern.

The 95th percentile is a number that is useful for describing the range, or spread, of a set of numbers. Within a group of numbers, 95% will be at or below the 95th percentile. The remaining 5% will be above it. If an individual has a PFC level close to the 95th percentile it means they have a PFC level at the higher end of what is typically found in the U.S. population.

The national mean and 95th percentile do not tell us anything about possible health impacts. It is simply a way for you to compare your results with others. Specific health effects cannot currently be linked to PFC blood levels. Therefore, our ability to interpret an individual's results is limited, and it is unclear what detection of these chemicals means for a person's health.